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MALARIA, IRRIGATION, AND SOIL EROSION IN CENTRAL SYRIA

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THIS study of the Selemiya region of central Syria had its origin in a modest wartime public-health program. Hundreds of patients suffering from malaria in the villages of this district were regularly treated by a mobile clinic, and it soon became obvious that this work had to be supplemented if not replaced by swamp drainage and other measures of malaria control. The necessary investigations showed that soil erosion in the hills in the east of the region was partly responsible for the swamps on the plain. The swamps themselves were frequently associated with ancient irrigation works. Thus various problems of the region—agricultural, social, and medical—were closely linked in origin and development. It was found that attempts to solve any one of them alone could not be more than partially successful, and the conclusion reached was that the ideal solution would have to be radical, comprehensive, and on a large-scale regional basis.

THE LANDSCAPE

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The greater part of the governmental subdistrict (caza) of Selemiya is a plain. Bounding it sharply on the west are low plateaus, capped by a level bed of basalt a few feet thick; to the southeast are ranges of hills, part of the Palmyrene group, to which the local collective name of Jebel Bil'as may be given.

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The ground slope over much of the region is toward the town of Selemiya; drainage from an area of 620 square miles converges on the low flat land around the town. Because of the continuous subsurface flow, a perennial stream rises at Ain ez Zerqa, to flow 12 miles to the west to join the Orontes. All other perennial streams, however, are only a few hundred or thousand yards long and are used for irrigation; most of them rise in artificial underground channels. Most of the watercourses are wadis, dry or nearly dry for much of the year. In the hills these are steep, V-shaped valleys, on the plain generally wide, shallow, gravel-filled channels in gentle, open valleys.

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Figure 2 gives a simplified indication of the configuration. Hydrologically, the strata may be simply grouped into the Cretaceous limestones

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11 PUBLIC HEALTH

The progress in public health has been much less spectacular and less steady than that in education. Expenditures on public health have increased sharply only in recent years. In 1954 the budget of the Ministry of Public Health amounted to £S 8.764 million or 4.2% of the regular budget, as compared with actual expenditures of £S 3.431 million or 3.4% of the total in 1945. Health facilities have been gradually expanding. The number of hospitals has risen from 35 with 1,785 beds at the end of 1945 to 61 with 4,094 beds at the end of 1954. Over the last seven years the government has spent, on an average, £S 1.3 million on public health facilities, so that government hospitals now have a total of 3,000 beds. The number of doctors in Syria has risen from 616 in 1945 to about 880 at present.

Yet it is generally recognized that the state of public health is far from satisfactory. This conclusion rests upon testimony and observation rather than health statistics. The statistics, indeed, are so inadequate as to provide little indication of health conditions. The number of deaths registered, for example, imply a death rate of but seven per thousand, but the record of deaths is evidently very incomplete and the actual death rate rather high. There is still a high incidence of debilitating diseases. Malaria, for example, is prevalent in many parts of Syria. Diseases such as tuberculosis and the many varieties of intestinal infections, which are generally associated with poor sanitation and hygiene, overcrowding and low standards of living, are quite widespread. Infant mortality is particularly high. Thus 38% of the registered deaths in 1951-53 occurred among children less than five years old, and of these about the same percentage died of diarrhoea and enteritis.

An effective campaign to raise health standards would require resources which Syria will hardly be able to mobilize at its present stage of development. The health program will have to remain rather modest and should attempt primarily to remedy the more glaring deficiencies. These are, principally, the inadequate attention given to preventive medicine and the markedly unequal geographic distribution of existing health facilities.

Preventive Medicine

The prevention of disease is likely in the long run to be more economical than curative medicine. The mission believes that this aspect of

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public health should receive primary emphasis in the program over the next six years. To this end we recommend a campaign against the malarial mosquito, improvement of drinking water supplies, greater stress on health education and the construction of a number of health centers.

Enough experience has now been gained in many countries to demonstrate that the scourge of malaria can be virtually wiped out by effective spraying with DDT. Such a program is receiving attention in Syria. Two WHO and UNICEF projects dealing exclusively or partially with malaria control (one in Homs and Latakia and one in Kamichliye) were being carried on in 1954; the mission understands they are to be continued until countrywide coverage is achieved. In 1954, spraying operations carried out by the government, with and without assistance by international agencies, were designed to protect some 380,000 persons, more than half the population of the malarial areas. The cost of malarial control in Syria is relatively high, an estimated U. S. $0.35 per person; nation-wide coverage would cost something over £S 810,000 annually. The mission has made provision in its recommended program for expenditure of £S 2.75 million for malarial control, which should be sufficient for three sprayings, of full coverage, during the period of the program.

Polluted drinking water is apparently an important cause of disease. Many communities are without pure water supplies. It is well recognized in Syria that this is one of the central problems which must be tackled. A program for community water supplies will be discussed in the next chapter.

The relationship of personal hygiene and sanitation to disease is a subject which must obviously be constantly stressed not only in schools and in the army, but also among adults generally. Prevention of disease is at least in part a matter of overcoming ignorance. The mission suggests that an effective health education be initiated to emphasize the maintenance of positive health as well as the prevention of diseases, in connection with education programs in elementary and secondary schools and adult education in the rural community improvement programs already recommended.

In this connection, the mission considers it important to establish a number of rural health units in different localities according to the recommendation of the Second Expert Committee on Public Health Administration of the World Health Organization (WHO Tech. Rep. Ser. No. 83). This could probably best be planned in connection with any community development scheme to be initiated in the country. In this case it would be

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744 advisable to initiate a pilot demonstration unit as a part of a community center in a rural district working in close coordination with other social and economic development projects in education, agricultural extension and social welfare. Particular emphasis should be placed on preventive health work, prenatal care and child health. This unit will also serve as a training center for the rural health workers to obtain their practical knowledge and experience in rural health work. One such pilot unit is planned by the government and WHO for 1956, utilizing TA funds.

If the demonstration proves to be successful, the present village dispensaries should gradually be grouped together and expanded to become rural health units. The existing staff in the dispensaries should be sent to the pilot unit to go through a course of training to prepare them for working in the new units.

As a start the mission recommends the construction and operation of one such experimental health unit. About £S 350,000 should suffice for construction of the necessary buildings and equipment, which need not be elaborate.

Hospital Facilities[34]

743 There is unquestionably a need for many more hospitals. The principal aim in the immediate future, however, should be to build hospitals in areas which now have virtually none. For the country as a whole, there are now, in terms of the population at the beginning of 1952, 1.23 hospital beds per thousand inhabitants. The number of beds per thousand varies widely, however, from a high of 2.88 in the city and province of Damascus to 0.9 and 0.92 in the provinces of Aleppo and Homs and a low of 0.25 and 0.44 in the Jezireh and the Euphrates. Out of 44 *qadas* or counties in the country, 28 do not have any hospitals at all. A large part of the rural population is in fact denied hospital service.

An adequate program for equalizing hospital facilities would involve the provision of 3,400 beds. Over the next six years only a start can be made, by providing an additional 1,000 beds at a total cost of £S 7 million. Of this total, we suggest that 250 be allocated to the Jezireh; 300 to the Euphrates; 400 to the province of Aleppo, with perhaps 100 in the town of Jisr ech Choghour, which is likely to grow rapidly with the development of the Ghab; and 50 to Palmyra.

[34] See Annex I, p. 463.

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743 In addition it would be desirable to build some new village dispensaries, which now number 96, at a cost of about £S 350,000, and to provide a similar sum for the construction of quarantine stations and minor health facilities.

To provide an adequate staff for the recommended additional medical and health facilities, the government must plan a training program. The faculty of medicine in Damascus may have to increase the enrollment of students to provide enough doctors for the new hospitals and health units. Many nurses would be needed for the hospitals, health units and dispensaries; nursing training facilities should therefore be increased. Midwives, laboratory technicians, sanitary inspectors and other medical health auxiliary personnel would also be needed to staff the new health services. The fellowships provided by WHO and the nursing education, maternal and child health and tuberculosis demonstration and training projects assisted by WHO should therefore be coordinated and if necessary expanded to meet the need for technical personnel.

In addition to the cost of the staff training program, some funds will no doubt be needed for reconstruction and expansion of hospitals; we have included £S 1 million in the recommended program for these purposes.

743 657 A revision in the methods of planning and building new health facilities appears necessary. In the past, new hospitals have frequently been built without any consultation with the Ministry of Public Health. Decisions to build have generally been made in response to local requests relayed through the Ministry of Interior, approved by the Ministry of Finance and carried out by the Ministry of Public Works. In the future the Ministry of Public Health should be enabled to plan for the construction of new facilities in accordance with a careful appraisal of the most urgent requirements. The Ministry of Public Works might well continue to do the actual construction, but in accordance with plans approved by the Ministry of Public Health and on a basis which would enable the latter Ministry to make timely preparations for the equipment and staffing of new hospitals.

● *Proposed Outlays*

744 657 In proposing the construction program outlined above, the mission has kept in mind the need for providing additional funds for operation and administration. After taking this into account, it is expected that expendi-

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tures on public health, including new construction, would rise from a total of £S 10.052 million budgeted for 1954 to an average of £S 12.358 million in the six-year period 1955-60. The expenditures envisaged for the entire period 1955-60 would be distributed as follows (in thousands of Syrian pounds):

	Total	Annual average
Anti-malarial campaign and dispensaries	3,100	517
Establishment of new hospitals and health units	8,350	1,392
Quarantine stations	300	50
Administration and operation of existing and new facilities including training of technical personnel	62,400	10,400
Total	74,150	12,358

III HOUSING

The postwar period has witnessed a considerable housing boom. In recent years construction has been on a scale double that of prewar years. The wartime backlog in housing, the increasing prosperity in the postwar period and the tendency toward a break-up of the larger family units have all contributed to this boom. Aside from a few houses built for civil servants, all of the construction has been private, and it has taken place without the help of a mortgage financing institution. In terms of value, probably over 80% of the new housing has been of the Western or European type, which is too costly for the vast majority of the people.

While the housing of the rural population and the lower classes in the cities is undoubtedly very bad, significant general improvement is likely to come about only as incomes and standards of living rise. It would be impractical for the government to direct substantial resources into housing for the masses which could not be supported by the present productivity of the economy. While the mission firmly believes that the state should take a greater interest in the improvement of housing, for the immediate future the government's role will have to be confined to (1) developing, through experimentation, methods of cheap and durable construction, (2) planning and assisting housing in new rural settlements, (3) constructing

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would enable poultry to make a substantial contribution to family incomes 232
in the villages.

Very recently the Bedouin shepherds have apparently acquired confidence in the sheep pox vaccine, and the mission was informed that demands for vaccination in 1954 far outstripped the capacity of the field services. Sheep pox is a disease which annually causes considerable losses, but for which an efficient vaccine is available. It would seem incumbent on the government to insure that the service has the facilities for applying vaccination to the flocks.

It is recommended that with the assistance of the district veterinary staff the laboratory carry on seasonal surveys of blood mineral levels of sheep and cattle, and helminth burdens. Young veterinary assistants or science graduates should be trained to collect the blood samples in the one case and the parasitic worms in the other. The blood mineral determination and the determination of parasitic worms would be made at the laboratory. Therapeutic and control measures based upon these findings should be applied by the district veterinary staff in consultation with the laboratory. Some strengthening of laboratory staff at the veterinary assistant level will be required if systematic studies of this nature are to be undertaken.

The increasing incidence of brucellosis and tuberculosis in dairy cattle in the suburban areas to which reference has been made in the Main Report calls for investigation by biological tests and the application of control measures. The introduction or development of more productive types of livestock inevitably brings more problems for the veterinary service; unless the service can cope with these problems and meet increased demands for assistance the improved types of stock will not survive.

Artificial breeding methods, which are likely to be employed on an increasing scale as livestock farming methods advance, should be completely controlled by the service. The method can be as efficient in spreading certain diseases as it is in distributing the sperm of superior sires; the fullest possible measure of veterinary control must be exercised to guard against this danger.

The control of abattoirs and meat inspection is performed by veteri- 232
narians and veterinary assistants in the employ of the municipal authorities 744
of such cities as Damascus and Aleppo. The municipal abattoir of Damascus is about 130 years old and is now almost enclosed by the town. It is

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231 desirable that a modern abattoir be built in a more suitable location; the present problem of drainage disposal would alone warrant this measure. There should be no difficulty about the provision of capital for such a project, since the municipal authority can recoup its expenditures by the collection of fees.

232. The present budget of £S 188,000[8] for personnel and equipment bears no relation to the value of Syrian livestock or to preventable losses. For more effective disease control the mission has recommended that an additional £S 1.2 million be made available during the next six years.

IX EDUCATION, RESEARCH AND EXTENSION

Education

Elementary agricultural education. Since 1949 the rural elementary schools have devoted the two final years (fourth and fifth grades) to theoretical and practical instruction in agriculture and hygiene. At present 111 offering this type of instruction, each with a field of five *donums*[9] for practical field training, are distributed through *mohafazats* as follows:

Damascus	37	Dera'a	13
Aleppo	9	Soueida	11
Latakia	11	Deir ez Zor	9
Hama	5	Hasetche	5
Homs	11		

The pupils (9,000 in 1954) learn the basic principles and techniques of agriculture, practicing them in the school gardens.

Clearly this number of schools cannot provide basic rural education for all the children of Syria's 5,500 villages. Apart from the need to build more schools and enlarge existing ones, a way must be found to train additional agricultural teachers; the teacher training and secondary agricultural schools in Dera'a and Kharabo do not turn out sufficient numbers.

The mission therefore makes the following recommendations:

[8] £S 50,000 for laborers at the Damascus veterinary research center and in the provinces; £S 40,000 for purchase of animals and feed; £S 98,000 for technical requirements (£S 20,000 for the Damascus laboratory; £S 58,000 for the preparation of vaccines and biologics material; and £S 20,000 for medicines in respect of the treatment of parasitical diseases).

[9] A donum = 0.1 hectare.

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or secondary education can be built. An expenditure of £S 3 million a year would permit construction of 500 classrooms a year or about 100 new schools, without auditorium and other facilities which can be built later. At such a rate, the country's estimated future requirement of about 4,000 schools (assuming that there are already 1,000) would be fulfilled in about 30 years. Meanwhile a considerable number of schools will undoubtedly have to continue in rented buildings.

The opening of new schools will have to be carefully planned in the light of the geographic distribution of existing facilities, conditions of overcrowding, the demand for schooling as influenced by economic factors, the distance of school-age children from existing schools and the availability of teachers. Now that a considerable portion of school-age children are in fact going to school, the location of new schools must be given more thought in order to ensure that they will meet a real need.

Thought should be given to standardization of desks and equipment and for their manufacture in Syria. There are also future possibilities for local production of some other items now imported, such as slides, maps, etc.

Finally, we recommend a reorganization of the Ministry of Education. In addition to a branch of general services with sections for planning, building, inspection, etc., there may be merit in creating five other branches, to correspond to the five major aspects of the educational program: primary education, secondary education, vocational education, fundamental education and higher education.

III PUBLIC HEALTH

Hospitals and Dispensaries

The country's 24 public and 37 private hospitals have, as of the end of 1954, a total of 4,094 beds. This means only 1.19 beds[8] for over 1,000 inhabitants, as compared with 5 per 1,000 in England, the U. S. and New Zealand or the 15 per 1,000 which some authorities consider optimum for a really healthy population. Only 1,880 of the beds, or 0.56 per 1,000 inhabitants, are in general public hospitals.

[8] In this and subsequent comparisons the number of beds per 1,000 inhabitants has been calculated on the basis of the 1952 population.

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743 Worse than the low ratio of beds to population is their distribution. Syria is divided into 44 *qadas*, or administrative areas, the average population of which is 75,000. Twenty-eight of these have no hospitals, public or private, whereas others have as many as 4.35 beds per 1,000 inhabitants. The distribution of beds in general governmental hospitals alone is no better: 29 qadas have none at all, but in Damascus and the Hauran center the ratio is 1.67 beds per thousand inhabitants.

Some people, especially in the eastern parts of the country, are as much as 250 kilometers from the nearest hospital. Even by private automobile it would take them at least a day to reach it, and then there would be no assurance of a vacant bed. Among those who must rely on camels or donkeys, as in the rural areas, many people are at least five days' travel time from a hospital. Since a hospital is supposed to serve a population living no more than one hour away, as a practical matter a great many of the people may be said to have no access to a hospital. Thus in the two large provinces in northeastern Syria, the Jezireh and Euphrates, there is only one small public hospital at Hassetche and another at Deir ez Zor.

The inadequacy of the hospitals, especially the general ones for the most part government-owned, which serve the poorest people, is shown by the ratio between number of patients and the population of the provinces. The country-wide average for 1951 and 1952 was 8.8 patients per thousand inhabitants of each province but the proportion ranges from 18.3 for Damascus to 2.2 in the Euphrates. Recent figures for France and the United States indicate that 40-80 persons per thousand are cared for at hospitals.

Another significant factor in many of the hospitals is the small number of patients attended in relation to beds available. In the Euphrates province, for example, there were 6.8 patients per bed compared to 24.6 and 22.6 for the Damascus and Homs provinces, respectively, and a country-wide average of 15.5. If the Damascus bed-patient ratio were country-wide, the 1,880 beds in general government hospitals could serve 46,000 people annually instead of only about 29,000, thus achieving a 58% increase in service with no increase in beds. Where there is both a low ratio of hospital beds to population and a low ratio of patients to beds, as in the Euphrates province, this condition is presumably due not only to the fact that existing hospital facilities are inaccessible to most of the population, but perhaps also to the poor service provided by the hospitals.

Syria has 96 governmental dispensaries or about three per 100,000

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inhabitants.[6] Here again there is unequal distribution, ranging from 5.1 per 100,000 in the Hauran area and 3.6 in Damascus down to 2.0 in the Euphrates province. Present-day standards call for one rural hospital for every 20,000 inhabitants, yet here many areas which should, by that standard, have a hospital, lack even a dispensary.

The average number of visits at dispensaries is 202 for every thousand persons, varying from 372 in the Hauran and 363 in Damascus down to 60 in the Euphrates. Since the dispensaries operate for the most part in areas without doctors, the figures must be taken to include calls which in other circumstances would be made on private doctors. There are about 7,000 visits per year at each dispensary, or an average of 23 visits per working day.

Medical Staff

In all, the country has 880 doctors including 76 foreigners. Thus there is one doctor for every 3,800 persons. In this respect Syria's standing compared with other countries is not strikingly low. The United States, Europe and the USSR have one doctor for every 1,200 persons; Latin America, South Africa, Australia, New Zealand and Japan have one for every 1,700. But Asia (excluding the USSR and Japan) and Africa (without South Africa) have only one doctor to 12,000 persons and Iraq has one per 7,000.

Yet while Syria may not be handicapped by an actual lack of doctors, their distribution over the country is as unbalanced as that of the hospital and dispensary facilities. There are some areas with populations of 25,000, without a single doctor. As for trained nurses, midwives and other auxiliary personnel, these are in fact scarcer than doctors and constitute a problem of major importance.

The mission's proposed program, as outlined in the Main Report, would place greater stress on the prevention of disease than in the past.

It is difficult to estimate the possible cost of a full disease-prevention program; it might mean an expenditure of £S 2 per person per year or £S 7 million annually, not including the large expenditures for water supply, drainage, sewerage and other major works. Obviously a program of this magnitude cannot be recommended for Syria in the near future. A

[6] In the provinces of Damascus and Homs three touring doctors provide the same type of services at the dispensaries.

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more realistic minimum program would call for improvement of the water supply, vaccination against tuberculosis and anti-malaria measures.

The first step in assuring a supply of pure water at minimum cost is a survey of present and potential sources. Thereafter there should be measures for the purification of supplies, storage, transportation of pure water to the settlements, distribution to the settlements and to individual properties, and finally the provision of piped water to every building. But for many Syrian communities the construction of a network to bring water to every property is not the best way to begin, since it slows the rate at which water can be provided to new consumers. The program at first might better be confined to the survey and exploitation of new sources, storage and transportation to settlements, and distribution to key points in the settlements; only thereafter should the next steps be taken in the larger settlements.

Disease-carrying mosquitoes can be combatted either by eliminating their breeding places or by a continuous spraying program. By itself the first is too costly and would take many years, although we recommend elimination of breeding grounds in connection with the irrigation and drainage projects. By spraying, however, it has been demonstrated in many countries that the incidence of malaria can be reduced by more than 95% at a yearly cost of no more than $0.25 per capita. In Syria such a program may cost $0.35 or £S 1.25 per person protected, which means about £S 810,000 annually on the assumption that 650,000 persons must be protected. Greece has effected a saving of $1 million annually in quinine alone. An equally successful program in Syria would mean a very substantial annual saving and this would be but a fraction of the economic gains from the increased labor productivity through freedom from disease.

Additional Hospital Facilities

Any ambitious hospital building program would overtax the financial resources of the country and the available medical and auxiliary staff. Even a program to build hospitals in areas now without them and to add beds to existing hospitals in such a way as to bring them up to the population-bed ratio of Damascus would cost about £S 24 million and probably result in acute operating difficulties. We have therefore suggested that only about 1,000 beds be added to meet the most urgent requirements. The suggested distribution—250 for the Jezireh, 300 for the Euphrates, 400 for

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the province of Aleppo, and 50 for Palmyra—should be considered tentative. The new facilities should be so distributed as to make them accessible to the population which is in practice not now served by existing facilities. The location of new hospitals in the geographically extensive provinces of the Jezireh and Euphrates must be considered very carefully. Kamichliye should manifestly have a hospital, and other small hospitals might be located in both the eastern and western portions of the Jezireh. In the Euphrates province the needs of Raqqa and Abou Kemal should be considered. In the province of Aleppo a hospital will presumably be needed in Jisr ech Choghour, which will be the center of a rapidly developing region. In the location of all new hospitals the ability to provide staff must be a governing consideration.

Cost of the Six-Year Program

The mission's estimates of the cost of the various parts of the six-year public health program are shown in Table 3.

TABLE 3 Proposed Six-Year Program for Public Health, 1955–60

(*Thousand £S*)

Projects	Total	Annual average
Anti-malaria	2,750	460
Water supply	•	—
Dispensaries	350	58
Total for preventive medicine	3,100	518
Alteration of existing hospitals	1,000	167
1,000 more beds	7,000	1,165
Health centers	350	58
Total for curative medicine	8,350	1,390
Minor health facilities	300	50
TOTAL PROGRAM	11,750	1,960
Total investment	10,250	1,710
Operation of new program	1,500	250
General administrative and operating expenditures, including training	62,400	10,400
TOTAL OPERATION	63,900	10,650
TOTAL OF EXPENDITURES	74,150	12,360

• The amounts necessary for pure water supply are included in the expenditures for the over-all water supply program.

up to 4,000 feet elevation, in sunlit pools in dried stream beds and in irrigation canals and seepages. Except at the higher altitudes, it is abundant from May to October, with peaks of activity between July and September. *A. sacharovi* is also a primary vector in many areas, breeding in swamps, irrigation canals and seepages, neglected water tanks and numerous other artificial collections of water. It is one of the principal vector species on the oasis of Damascus, where the miles of irrigation canals and numerous swampy depressions create favorable conditions for breeding. It is found breeding from March to November, but most prolifically in June and July. *A. claviger* is chiefly restricted to the towns and the surrounding villages, where it breeds in wells, cisterns and seepages, often even during the winter months. With *A. sacharovi*, it is responsible for the transmission of most of the malaria in the vicinity of Damascus and Aleppo. *A. sergenti* is a significant vector in the rice-growing areas in the Belikh and the Khabour valleys. *A. pulcherrimus* is also plentiful in the river basins of the northeastern provinces, and is regarded primarily as a pest.

Two species of *Aedes* are known to be present—*Aedes aegypti* and *A. mariae*. *A. aegypti* is widespread in the western provinces, where it is the vector of dengue fever. Numerous species of *Culex* have been identified, but all are pests of no recognized medical importance.

Mosquito control work is carried on by the antimalaria service of the Ministry of Health, and in the cities of Damascus and Aleppo by the municipal authorities. Larvicidal measures, using DDT or oil sprays, are undertaken in the cities and the larger towns; however, residual spraying, with DDT preparations or Gammexane, is the usual means of control in the rural villages. A mosquito control program, based upon the residual spraying of dwellings and other buildings, was initiated in the villages around Damascus in 1949, and in the Hauran region in 1950, by the Ministry, in

144 co-operation with the Near East Foundation and other agencies. Similar operations have also been conducted by the Ministry in the town of Latakia and in the administrative center and the adjacent farms in the Jebel ed Druz area. In 1950, the government program covered a total of 224 villages, with an aggregate population of slightly over 180,000. A shortage of DDT necessitated the curtailment of the program in 1951, but the Ministry proposes to expand its activities to other malarious districts throughout the country as rapidly as possible. A demonstration control program was started in 1952 in the vicinity of Homs under the auspices of the World Health Organization. Anopheline control measures are carried on by the United Nations Relief and Works Agency in and around the refugee camps situated in malarious regions.

126 164 FLIES. Flies of the family MUSCIDAE are numerous, including *Musca domestica vicina, M. tempestiva, M. sorbens, M. vitripennis* and *Muscina stabulans*. They are abundant around markets, food shops and dwellings, and are undoubtedly implicated in the spread of intestinal infections. The stable fly, *Stomoxys calcitrans*, is prevalent. The myiasis-producing flies, *Chrysomyia albiceps, Calliphora erythrocephala, Oestris ovis, Lucilia sericata, Gasterophilus haemorrhoidalis, Wohlfahrtia magnifica* and species of *Sarcophaga* are known to be present, and are probably responsible for occasional cases of infection in man.

At least 6 species of sandflies are found in Syria. *Phlebotomus papatasii* and *P. sergenti* are involved in the transmission of cutaneous leishmaniasis, which is endemic in many parts of the country, particularly in the vicinity of Aleppo. *P. chinensis* and *P. major* occur and are potential vectors of visceral leishmaniasis, although the extent of indigenous infection is uncertain. *P. papatasii* is also the vector of sandfly fever, which is sporadic in this region.

144 126 571 A fly-control campaign was inaugurated in Damascus in 1946. The dwellings in the poorer sections of the city and the tanneries,

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744 the refuse dumps and other breeding sites
136 are sprayed with DDT preparations at in-
571 tervals between May and October.

136 LICE. Infestation with lice is common
571 among the inhabitants in the congested
361 quarters of the towns and in the villages and the Bedouin encampments. *Pediculus humanus corporis* is important as the vector of typhus fever; cases are reported almost annually. *P. humanus capitis* and *Phthirus pubis* are somewhat less frequent.

136 FLEAS. Numerous species of fleas para-
164 sitize the wild and the domestic rodents. The rat flea, *Xenopsylla cheopis*, is prevalent: it is the vector in sporadic cases of murine typhus, and in past decades it was implicated in the transmission of plague. The human flea, *Pulex irritans*, and the cat and the dog fleas, *Ctenocephalides felis* and *C. canis*, are widely distributed. The stick-tight flea, *Echidnophaga gallinacea*, sometimes attacks man, but it is of no known medical significance.

136 BEDBUGS. *Cimex lectularius* is an annoying pest in all parts of the country.

136 TICKS AND MITES. A variety of ticks,
232 including *Rhipicephalus sanguineus* and
164 several species of *Hyalomma*, infest the livestock. *Ornithodorus tholozani* is found in the rural areas, where it is the local vector of tick-borne relapsing fever.

136 The grain itch mite, *Pediculoides ventri-*
164 *cosus*, is plentiful in the grain-producing regions. It frequently attacks man, causing a painful rash. The human itch mite, *Sarcoptes scabiei*, is widely distributed, but it is decreasing steadily in prevalence.

136 SCORPIONS AND SPIDERS. Several species of
752 scorpions are present, including *Buthus quinquestriatus, B. judaicus, B. crassicauda* and *B. europeus*, and *Scorpio maurus propinquus* and *S. maurus fucus*. Serious systemic effects resulting from scorpion stings
[135] are rare, but deaths are sometimes recorded among young children, usually after attacks by *B. quinquestriatus*.

136 The poisonous black spider, *Latrodectus tredecimguttatus*, is found in some localities.

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Reptiles. Venomous snakes are not common, but at least 4 species of vipers are known to be present. The carpet viper, *Echis carinatus*, exists only in the north, while *Vipera lebetina lebetina*, *V. lebetina xanthina* and *V. palaestina* are reported from many parts of the country. 126

Rodents. Rats and mice are numerous. The usual domestic rats are *Rattus rattus rattus* or *R. rattus alexandrinus*. *R. norvegicus* sometimes invades the port towns of Latakia.

Mollusks.* The fresh-water snail, *Bulinus truncatus* (= *B. contortus*), inhabits some of the tributaries of the Belikh and the Khabour rivers, near the Turkish border. It is the intermediate host of *Schistosoma haematobium*, which is reported from several foci in that region. 136 164

Plants. Various trees, weeds and grasses are capable of inducing allergic manifestations in susceptible individuals, but no precise information is available. 137 152

The broad bean, *Vicia faba*, which is grown extensively as a food, may be toxic to young children when it is eaten raw. A few deaths are observed each year, among children in both urban and rural communities. Occasional cases of lathyrism occur when the "Indian pea," *Lathyrus sativus*, a plant widely cultivated for fodder, is used for human consumption. [135]

Food Sanitation

Municipal regulations govern the sanitation of the food supplies in the cities of Damascus, Aleppo, Homs, Hama and Latakia. Restaurants, markets and other premises where food is sold are inspected at regular intervals by the municipal sanitary officers, and food handlers are required to register for examination at 6-month intervals. Municipal slaughterhouses are established in towns with populations of 20,000 and over, and are operated under the supervision of the health authorities. The meat animals are inspected before and after slaughter by veterinary officers of the Min- 744

* See footnote, page 10.

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63:Simmons et al G-5 (1941-1951) 1954
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istry of Agriculture, and all meats offered for sale must carry an official stamp of approval. Few controls exist over the production of milk, however, except in some of the larger cities. Cow's or goat's milk is normally sold in bulk and peddled in donkey carts. Herds of goats are frequently driven through the streets, the animals being milked while the customer waits. The dairies and the herds which supply milk to the cities of Damascus and Aleppo are subject to inspection by the municipal veterinarians. Samples collected from restaurants and other food establishments may also be submitted to the food control laboratories of the Ministry of Health for bacteriologic examination. There are no modern facilities for pasteurization. A few dealers in Damascus retail bottled milk which has been pasteurized by submersion in boiling water baths. Little milk is consumed raw, since boiling is the general practice, but butter and cheese are frequent sources of infection. Brucellosis is enzootic among both goats and cattle, tuberculosis among the cattle.

HEALTH SERVICES AND MEDICAL FACILITIES

Health Organizations

The present health organization of the Syrian government has evolved since 1943, when the republic was established. The health and the medical services are administered by the Ministry of Health (and Public Assistance), with headquarters in Damascus. Executive authority resides in the Minister, who is advised on matters of policy by a Supreme Public Health Council. He is assisted by a Director General of Health, who, in turn, is advised by a Public Health Consultation Council made up of experts in representative technical fields. The functions of the Ministry are discharged through 7 constituent departments —public health affairs, public health laboratories, hospitals and clinics, inspections, pharmaceutical affairs, supplies and administration and records.

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744 The Department of Public Health Affairs has divisions dealing with the control of communicable diseases, endemic diseases, maternal and child health, community health education, nutritional problems and rural health. A subordinate branch concerned with the control of tuberculosis is 743 included under communicable diseases. Responsibility for the maintenance of hospitals and other medical care facilities, in both urban and rural areas, is centralized in the Department of Hospitals and Clinics, while the over-all supervision of government institutions is delegated to the Department of Inspections. The Department of Public Health Laboratories operates diagnostic, biologic and rabies control units. The activities of the Ministry in each of the 9 *muhafazats*, or provinces, are conducted by provincial health departments.

744 Health organizations which function under the municipal authorities, independently of the Ministry, exist in Damascus, Aleppo, Homs and Hama. They are concerned primarily with the enforcement of sanitary measures and the control of communicable diseases, and do not support hospital or dispensary services.

Medical officers under the jurisdiction of the Ministry of the Interior are stationed in each of the municipalities, and furnish medical care to certain indigent population groups. The Ministry of Health co-operates in the provision of technical services when needed. The veterinary division of the Ministry of Agriculture maintains services for the inspection of meat and milk supplies in conjunction with the municipal health departments. The Ministry of National Economy supervises the health conditions in industry, and passes upon compensation regulations. The Department of Statistics in this Ministry is responsible for the compilation and the publication of vital and other statistics. The Ministry of Education sponsors an annual preregistration health examination of schoolchildren, and plans to organize a school health program in Damascus in the near future.

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63:Simmons et al G-5 (1941-1951) 1954
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747 The Red Crescent Society carries on a campaign against tuberculosis throughout the country, and operates a tuberculosis dispensary in Damascus. The Goutte de Lait Society of Damascus supports infant welfare services in association with the government's maternal and child health center.

The Near East Foundation initiated a comprehensive rural demonstration program in villages near Damascus in 1946, in conjunction with the Ministries of Agriculture, Education and Health. In addition to activities for the improvement of agriculture, it operates 5 child health centers, each serving 10 to 20 villages. Courses are conducted at the largest center for the training of local village midwives in improved technics of midwifery. When the program was expanded in 1951, the Foundation planned for the development of co-ordinated maternity and child health services, including well-child clinics and home visiting, in the village centers and the organization of a special course for the training of rural sanitarians. Since 1949, it has participated with
747 744 the government health authorities and the successive agencies working for the relief of the Palestinian refugees in a malaria control program, based on residual spraying with DDT preparations, or Gammexane, in villages in the Damascus region. In 1950, it co-operated with the Ministry and the Trans-Arabian Pipeline Company in residual spraying operations in villages and refugee camps around Der'a, in Hauran *muhafazat*.

747 648 Hospitals and related health work are conducted by various mission societies in Damascus, Aleppo and Deir ez Zor. Health and medical care services are also provided by the larger industries for the benefit of their employees. The United Nations Relief and Works Agency carries on public health and medical programs in the refugee centers in southern and western Syria.

Medical Institutions

743 **Hospitals and Dispensaries.** In 1951,

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of the babies treated at the maternity and child health center in Damascus suffer from intestinal infections. Epidemics of diarrheal disease often coincide with the ripening of the apricot crop. The ready contamination of this thin-skinned fruit by flies and other insects accounts for the local designation of the early summer diarrheas in the fruit-growing districts as *mish mish* (apricot) disease.

Cholera. Serious outbreaks have accompanied the introduction of cholera in the past, but the disease was absent from Syria from 1928 to 1947, shortly after the epidemic in Egypt. On December 19, 1947, cholera was reported from 2 adjacent villages in the province of Hauran, on the road from Palestine to Damascus. At the same time, cases occurred in 3 villages in the irrigated plain of the Al Ghouta, within 3 or 4 miles of Damascus. Although 45 cases, with 18 deaths, were reported officially, it was generally believed that the actual incidence totaled at least 77 cases.

Quarantine measures were promptly imposed in Hauran and Damascus provinces, and all persons entering or leaving those regions were required to possess certificates of immunization against cholera. Over one and one half million individuals were inoculated with cholera vaccine in the vicinity of Damascus, as well as in the affected districts of Hauran and in the city of Aleppo. Supplies and assistance were furnished the Ministry of Health by the World Health Organization, the Near East Foundation and the Egyptian and Lebanese governments. Vaccine was also provided jointly by the Arabian American Oil Company and Trans-Arabian Pipeline Company. No cases were reported after the initial outbreaks, and on January 17, 1948, Syria was declared free from the disease. The exact origin of the epidemic was never definitely established.

Helminthiases. ANCYLOSTOMIASIS. Hookworm infection, caused by *Ancylostoma duodenale*, is prevalent among the agricultural workers in foci along the banks of the

164 the Qoubour el Bid section of the Al Jazira, along branches of the Khabour River north-
136 east of Hassetché. *Schistosoma haemato-*
164 *bium* is the only species identified in con-firmed cases, but rectal complications are sometimes recorded. At present, the disease is confined to circumscribed foci, but in view of the irrigation and the agricultural potentialities of the region, its control is of
164 major public health significance. The foci
361 are apparently of recent origin. Whether the
169 infection was introduced by Senegalese
744 troops stationed in the vicinity, as claimed by the local inhabitants, or by nomadic tribes from Iraq is a matter of conjecture. Surveys have been made within recent years, under the auspices of the Ministry of Health and co-operating international organizations, and, although some discrepancies are evident in the determination of the infection rates in different villages, all emphasize the seriousness of the problem. Competent local authorities estimated in 1951 that the total incidence in that year approximated 12,000 cases.

659 In surveys undertaken in 1948,[24] the ex-
164 amination of urine samples collected from 545 persons in Qoubour el Bid and neighboring villages on the Gerahi branch of the Khabour River indicated general infection rates of about 62 per cent. They averaged 73 per cent among the men and the boys, and 49 per cent among the women and the girls. Moreover, they were consistently higher, in both sexes, in individuals under 20 years than in the older age groups.
[361] Equally high infection rates were found among the seminomadic peoples in the Tell Abiad area. A system of spot checking suggested probable infection rates of almost 100 per cent among males and of 60 per cent among females in 3 of the 5 villages visited.

164 A more exhaustive investigation in 1950[25]
659 revealed the presence of infection among
361 about 24 per cent of the inhabitants of 58 villages situated along 4 tributary streams in the Qoubour el Bid area. The infection rates ranged from 1 to 88 per cent: the most

highly infected villages were situated on the Gerahi and the Soublakh wadies. Similar surveys in 9 villages in the Tell Abiad area showed an average infection rate of 77 per cent, with the greatest prevalence in the villages on the Tell Abiad and the Slouq branches of the Belikh. Infection is apparently acquired early in life through swimming, washing or other contact with streams inhabited by infected snails. The intermediate host, *Bulinus truncatus*, has been collected from several localities.

Two mobile treatment teams were operated by the Ministry of Health in the infected areas in 1951. Plans for the inauguration of a snail eradication program were also under consideration.

OTHER HELMINTH INFECTIONS. Infection with one or more varieties of intestinal worms is prevalent in all parts of the country. The insanitary habits of the people and the frequent use of night soil as fertilizer promote the spread of the different species. Ascariasis is widely distributed. Infection rates ranging from 30 to 86 per cent have been demonstrated in Aleppo, Damascus, Homs and Hama, as well as in the surrounding villages. The infection is most prominent among the children, in both urban and rural areas. Trichuriasis is also widespread, but enterobiasis and strongyloidiasis tend to be sporadic.

Taeniasis is common. The beef tapeworm, *Taenia saginata*, is enzootic among the cattle, and the popularity of raw, or underdone, meat in certain national dishes is responsible for considerable human infection. The pork tapeworm, *T. solium*, is sometimes encountered among the Christian communities. Occasional infections with the dwarf tapeworm, *Hymenolepis nana*, are observed in most districts.

Hydatid disease is not unusual. *Echinococcus granulosus* is enzootic among dogs, sheep, goats, cattle and camels. In studies reported in 1936,[40] cysts were detected in 25 to 30 per cent of the sheep and the goats examined in slaughterhouses in Aleppo, Damascus and Homs. Infection was uni-

761 369 164 Comparative rates in urban and rural communities were determined in a series of tests on unorganized groups in the city and two adjacent farming districts. In Damascus, positive reactions to tuberculin were given by 47.7 of the boys and 40.8 per cent of the girls tested at 15 years of age. At 20 to 25 years of age, positive reactions were obtained in 86.7 per cent and 77.4 per cent, respectively; at 40 to 45 years of age, in 95.6 and 86.6 per cent, respectively. In the rural communities the positive reaction rates were consistently lower, but approached the urban levels in the older age groups. Among individuals at 15 years of age, 51.6 per cent of the boys and 27.2 per cent of the girls reacted to tuberculin in one area, and 18.1 per cent of the boys and 21.2 per cent of the girls, in another. At 40 to 45 years of age, the proportion of positive reactors averaged 80 per cent in the first series and 50 to 100 per cent in the second.[48]

744 751 747 Within recent years the Ministry of Health has embarked upon a tuberculosis control program. In January, 1950, a tuberculin testing and BCG inoculation campaign was organized under the auspices of the United Nations International Children's Emergency Fund and associated organizations, which was taken over by the Ministry in September. Surveys have been carried out in most of the provincial capitals and surrounding rural districts, and the Ministry contemplates the gradual extension of the campaign to cover the populations in all parts of the country. In the course of the investigations completed in 7 provinces between January and September, 1950, almost 417,000 persons were tuberculin tested, and over 188,000 were inoculated with BCG vaccine. The majority were schoolchildren, although miscellaneous population groups of all ages were also included. The proportion of positive reactors in the different provinces ranged from 23 per cent in Jebel ed Druz (As Suwaydah) to 42 per cent in Aleppo.

659 361 751

758 743 The diagnostic and the treatment facili-

of rabid dogs, but wolves, hyenas, jackals, rats and other animals are sometimes implicated. Prophylactic treatment is provided by the Ministry, and a special division for the preparation of antirabic vaccines is incorporated in the central laboratory in Damascus. From 140 to 250 persons were treated annually in the 4 years 1948-51.

Other Infections. Tetanus is endemic, and occasional cases are observed. Anthrax is enzootic among the sheep, and human infections sometimes occur in the agricultural areas. Sporadic cases of Weil's disease are reported.

Diseases Spread by Arthropods

Malaria. Malaria is a disease of major public health and economic importance, since it is endemic or hyperendemic in all populous sections of the country. The prevalence of the disease is directly related not only to the physical geography of the different regions, but to the degree and the type of cultivation. The most seriously affected foci are the plains around Damascus and Aleppo, the Orontes valley from Hama to the Turkish frontier, the irrigated zones bordering the Belikh and the Khabour rivers and their tributaries, and the swampy districts of Hauran province. Universally high infection rates are experienced during epidemic years, even in areas of low endemicity.

No large-scale surveys have been attempted, but accumulated studies provide rough estimates of the extent of infection in [illegible] areas. Prior to the development of a program for the control of malaria by the Ministry of Health and the Near East Foundation in 1949-50, the spleen index among children under 10 years of age in the villages around Damascus ranged from 40 to 80 per cent, with the highest rates in villages on the periphery of the Outaybeh swamps in the eastern part of the oasis. In the vicinity of Homs, the spleen rates normally average 50 to 70 per cent.

In the course of joint surveys made by the malariologists of the United Nations

Relief and Works Agency for Palestine Refugees and the Ministry in the Khabour and the Belik river basins in 1950,[8, 9] blood examinations were performed on small representative samples of the population. All age groups were included, although the majority of persons tested were under 15 years of age. The parasite rates averaged about 33 per cent in villages in the Belikh valley, while in the areas under perennial irrigation along the Khabour River and its tributaries, they varied from 33 to 94 per cent. In the rain-irrigated districts northeast of Hassetché, the rates declined to from 12 to 16 per cent. In many localities the malaria problem has been aggravated by the introduction of rice cultivation. In some, as in Ajaja, cultivation had to be abandoned, and in others, it is prohibited within a 2-mile radius of the villages.

The malaria season extends from April to November, with peaks of prevalence in July and October, but some transmission occurs throughout the year in most malarious regions. The relative proportion of *Plasmodium vivax* and *P. falciparum* infections varies according to the season and from place to place. *P. vivax* is usually responsible for 75 to 80 per cent of the cases of malaria in the Damascus area. *P. falciparum* and *P. vivax* were identified with about equal frequency, however, in the 1950 surveys in the Belikh and the Khabour valleys. In general, *P. vivax* predominates during spring and early summer, but is superseded by *P. falciparum* toward the end of the malaria season. *P. malariae* infections are rarely encountered.

Malaria control measures are undertaken by the municipal authorities in Damascus, Aleppo and a few other towns. Control programs, based upon residual spraying with DDT preparations or Gammexane, are conducted in towns and villages in limited areas by the Ministry of Health, often in conjunction with other agencies. In 1950, they covered villages in Damascus and Hauran provinces, the town of Latakia and a few localities in Jebel ed Druz. The most exten-

63:Simmons et al G-5 (1941-1961) 1954
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Distribution of Malaria in Syria

sive work has been carried on, in co-operation with the Near East Foundation, in the agricultural districts around Damascus where 224 villages with over 180,000 inhabitants were protected in 1949-50. A marked reduction in the number of cases has been noted in all the areas treated. Successive examinations of over 500 children in 16 treated villages near Damascus revealed a decrease in spleen rates of from 78 per cent in 1950 to 20 per cent in 1951.[8] A malaria control program was inaugurated in the Homs district in 1952, under the auspices of the World Health Organization. *Anopheles sacharovi* and *A. claviger* are the principal vectors in the Damascus region; *A. sacharovi* and *A. superpictus*, in the river valleys in the northeast.

Rickettsial Infections. Localized outbreaks of louse-borne typhus are recurrent during the winter and the spring months, particularly in the congested quarters of the towns and the cities and among the nomadic tribes. Over 1,900 cases were reported in 1942, when the acute shortages associated with the war created conditions conducive to the spread of the infection. Since that date no more than 30 to 95 sporadic cases have been recorded in any one year. Control measures, including deverminization procedures and the immunization of the exposed populations, are enforced by the health authorities in affected areas.

No differentiation is made in the official

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SILICOSIS AND BENIGN PNEUMOCONIOSIS ARE among the most important occupational diseases, but recognized cases are relatively few in number.

The smoking of *Cannabis indica* (hashish) and other types of drug addiction were formerly common. Within recent years they have been combated with some success by restrictive regulations and educational propaganda.

SUMMARY

Modern Syria, an independent republic since 1943, encompasses three of the former Levant states—Syria, Latakia and Jebel ed Druz. It has a population of slightly less than 3.2 million which is predominantly Moslem and Arab, but which includes several important religious and racial minority groups. Over three quarters of the inhabitants live in the western and the northwestern provinces which form the western arm of the so-called "Fertile Crescent."

The Ministry of Health (and Public Assistance), with headquarters in Damascus, is responsible for the health and the medical care of the population. Subordinate provincial health departments carry on the activities of the Ministry in each of the 9 *muhafazats*, or provinces. Autonomous municipal organizations function in Damascus, Aleppo, Homs and Hama. A limited number of philanthropic, mission and international agencies carry on health services in close co-operation with the Ministry. In 1951 there were 47 hospitals in Syria, with an aggregate capacity of 2,255 beds—approximately 0.7 beds per 1,000 inhabitants. Of this number, 22 hospitals, with 1,525 beds, were supported by the government, and the remainder by private organizations. In the same year, the Ministry maintained 111 clinics and dispensaries scattered throughout the country, including 3 maternity and child welfare centers, 7 mobile dispensaries and 6 mobile units for the treatment of specific diseases.

Water supplies are usually deficient, ex-

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mainly Christian) those run by foreigners are now finding it difficult to disarm the suspicions of the Government. In Lebanon, there are almost as many private as state schools and the foreign schools still work without difficulty. There are higher schools for teachers and for agriculture and engineering in Syria and for agriculture in Lebanon, but it is usual for a student to pass from a secondary school directly to a university. The following table shows the various types of schools and number of students.

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Type	Lebanon, 1951		Syria, 1951–2	
	Schools	*Students*	*Schools*	*Students*
State:				
Primary	977	83,252	1,850	237,775
Secondary	..	..	57	26,237
Technical	30	2,381	11	2,146
Teachers	2	165	10	1,233
Reformatory	1	106	—	—
Private	601	84,788	387	65,936
Foreign	149	41,402	56	9,852
Total:	1,760	212,094	2,371	343,179

.. = not available.

(Sources: *Statistical Abstract of Syria, 1951–2*, Damascus, 1952; *Statesman's Year-Book*, 1953).

The American University of Beirut is non-sectarian and has students from all over the Middle East. It encourages the use of Arabic as well as English, and its most renowned faculties are those of medicine and social sciences. The University of St Joseph in Beirut is run by the Society of Jesus. Attached to this university are schools of medicine, law, and theology, subsidized by the French Government and administered by the Society, in which teaching is carried on in the French language. A National University has recently been started by the Lebanese Government. The Syrian National University in Damascus teaches in Arabic and its most important faculties are those of law and medicine. A separate body for the study of the Arabic language is the Arab Academy of Damascus.

Health

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Malaria and amoebic dysentery are endemic and, though efforts are being made to drain breeding-grounds, preventive medicine is only in a rudimentary stage. Good hospitals exist in the cities and more are under construction; qualified doctors practise in all the towns, but in the villages there is still a lack

3:Royal Institute of International Affairs U-4 (no date)1954 M1 Middle East
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of clinics and in the cities a shortage of qualified staff to undertake massage, radiotherapy, and orthopædics, and there is special need to combat tuberculosis. Syrians and Lebanese are not addicted to hashish which, however, is grown in the Biqaa and smuggled to Egypt. The Lebanese Government periodically burns many of the plantations, which inflates the price of the surviving crop.

S L 433

Economic Survey

More than half the population of the two countries is engaged in agriculture which is the most important economic activity. Natural resources hardly exist; there is bitumen in Jebel Bishri in Syria but its production would not be economic; about 10,000 tons a year of asphalt is produced from the neighbourhood of Latakia; and salt is extracted in commercial quantities near Aleppo.

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Petroleum

For a number of years, associates of IPC searched for oil in Syria and Lebanon but without finding it in commercial quantities; in consequence, the areas held by these IPC associates have been given up. However, the two Governments are still anxious for further efforts to be made to find oil in commercial quantities. The importance of petroleum in the economy of Syria and Lebanon lies in the situation of the two republics athwart the pipelines from the fields of northern Iraq and Saudi Arabia which have outlets on the Mediterranean.[1] From Iraq a 12-inch and 16-inch line carry oil across Syria by way of Palmyra and Homs to Tripoli in the Lebanon. Together, these two lines can carry about 8 million tons of oil a year (160,000 barrels daily). A third IPC line from Kirkuk to Homs then bears north of the other two and reaches the sea at Banias, and so does not run through Lebanon at all. This new line is 26–30–32-inches in diameter and can deliver oil at about 16 million tons a year (320,000 barrels daily). From the fields of Saudi Arabia a 30–31 inch American pipeline (Tapline) travels over 1,000 miles on its way to Sidon in Lebanon, passing through Jordan and Syria. At present the line is pumping at a rate of about 15 million tons a year (300,000 barrels daily). It should be noted that these four lines all carry crude oil, some of which is refined on the Mediterranean shore for local requirements but the bulk is shipped as crude to the refineries of Europe and elsewhere.

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The line from Kirkuk to Haifa is not operating and the Haiaf

[1] See Appendix IV, p. 570 below.

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their animals. Malaria is prevalent. The majority are heavily indebted. The tenants on the irrigated land, with an average holding of 18 acres, are also poor but less heavily indebted, because they can depend on a more regular income.

The poorest class are the landless labourers whose income in money and kind amounts to 530 Syrian pounds a year (1944) (£10 at 1939 prices).[1] This is a starvation wage, which means that they can only eat enough in harvest time, and in winter must subsist on maize, bread, and grass.

The poverty on this estate[2] is therefore a result of the low productivity and the low proportion of the area under cultivation. One way of increasing the area cultivated would be by the use of machinery. Tractors were introduced some fifteen years ago, but proved too costly in relation to the low prices of Syrian grain; owing to lack of skilled drivers and proper maintenance they fell into disrepair. During the late war, however, as the price of grain rose, tractors were again used by some tenants who hired them from neighbouring estates.

Another way of raising production would be to increase irrigation since there is sufficient water to supply much more land. In this respect the estate is typical of the whole Homs–Hama plain, where much of the water which the French authorities have made available by irrigation goes to waste.

On this estate, therefore, the poverty of the cultivators is due to the landowner's failure to increase the productivity of the soil, rather than to his exploitation of the peasants; compared with other estates, this one is socially progressive, since the landowner's family have set up a school and also distribute medicines free of charge.

The second study covers a more intensively cultivated village, Ashrafie on the borders of the irrigated district of Damascus. Less heavily supplied with water than El Ghuta itself, Ashrafie has sufficient water to irrigate 10 per cent of the total land. The total area is 1,600 hectares or 4,000 acres, of which 2,400 are owned by four estate owners and the rest by peasants. The largest landowner is an absentee, letting his land on a 50 per cent share-tenancy basis; with definite three-year leases (by contrast with the usual custom under which the tenant has no lease).

[1] This is calculated on a rate of 9 Syrian pounds to £1, allowing for a six-fold increase in the Syrian cost of living between 1939 and 1944.

[2] [The estate of Misherfe, near Homs --Analyst]

ill-considered plans and avoid abrupt changes". A separate section in the Labour and Social Affairs Department of the Ministry of National Economy will run and supervise the centres, introduce local industries, study local conditions and implement a programme to raise the standard of living and promote local welfare. The Department will be assisted by an Advisory Committee comprising representatives from all agencies interested. Three bodies participate in the conduct of each model centre: one will consist of the staff members of the centre; the second the advisors to the staff members and the representatives of local administrative authorities; the third will be not one single committee but five committees of local residents, each to be responsible for a particular aspect of the centre. All will work under the supervision of the staff. The Decree defines the several units to be constituted for each centre and their respective responsibilities. 649 657 185

65. It is intended that when the Government has established a model centre in each province, the example will be followed in other districts by villagers who (as in the Egyptian prototype) will contribute to and share with the Government the expenses of maintaining a sufficient number of centres to cover the whole country.

66. The scheme which was inspired by the Cairo Seminar of 1950 had, we were informed, been discussed and agreed with other Ministries concerned and tentative arrangements had been made with the University authorities for their co-operation in providing the necessary personnel for the centres. Unfortunately, however, the project-law had not received the approval of the Ministers and Dr. Joukhadar gave no indication of any date for its operation. 242 185 474

67. On the introduction of Mr. Carroll Dejoe, FAO representative in Syria, members of the mission had the opportunity of meeting at the Ministry of Agriculture Mr. Akram Hakabi, the newly-appointed Secretary-General, who gave an account of agricultural extension work in Syria and of the development of agricultural co-operatives in the country. He foreshadowed a possible eventual use of the profits of these societies for community welfare purposes, but the movement is in its infancy.

68. Thanks also to the courtesy of Mr. Dejoe, the mission was put in touch with the local representatives of the Near East Foundation. In the absence in Beirut of the Programme Director, Mr. Eyer, his Deputy (Mr. Khoury) gave us the statement of the work of the Foundation in Syria which had been prepared for the recent Damascus Seminar which we had hoped to attend. Mr. Khoury accompanied us on his visit to Hasbabeyeh one of the four villages in which the Foundation operates demonstration centres in agriculture and sanitation and in home-making, respectively. Mr. Sivaswamy has prepared a detailed account (Appendix V) of his impressions of the work done at Hasbabeyeh. 242 185 744

69. The centre has been in existence one year. Its premises are in adobe houses such as are to be found in many villages in these parts. They have been simply adapted for their present purposes and the standard of cleanliness was pleasantly surprising. The staff consists of: (1) a sanitary inspector who looks after general sanitation, including mosquito control by insecticides and by drainage. (He makes a point of talking to the village people about water supply, latrines, etc.); (2) a nurse-midwife, whose duties are: ante- and post-natal care, examination of pregnant women, education of local midwives, regular supervision of the infants in the village. (There is no maternity clinic; the women are delivered in their homes); (3) a doctor, paid by the Foundation, who visits the centre once a week.